

NATIONAL TREASURY

User guide for standardised tariff setting tool

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1 Introduction

1.1 Overview of the tool

These user notes have been created to assist in the use of the National Treasury Excel-based standardised tariff setting tool which has been developed to assist municipalities in the tariff setting processes for water, sanitation, electricity and solid waste removal services.¹ The user notes should be read alongside the National Treasury standardised tariff setting methodology.

The tool has been developed in three levels. The data required becomes more sophisticated as users move to progressive levels in the tool. A user can choose to implement Level 1 only, or to advance to progressive levels of tariff setting based on the data available.

Essentially Level 1 looks at each service as a whole, Level 2 introduces customer categories, and Level 3 introduces tariff structures. The outputs from Level 1 include: (i) fixed costs per customer for each trading service as a whole; (ii) variable costs per unit for each trading service as a whole; and (iii) tariff revenue required per unit sold for each trading service as a whole. Level 2 outputs include: (i) average fixed and variable costs per customer category for each trading service; and (ii) revenue required per unit sold for each customer category within a trading service. The outputs from Level 3 include fixed charges and tariffs per block in an inclining block tariff for each customer category within a trading service.

The user must complete the first four data entry sheets in the tool for all services. These sheets have grey tab colours. The user may choose to run the remainder of the tool for a single service only.

1.2 What data does a municipality need to apply this tool?

The following data is required to implement this tool for the year in which the tariffs are to be set:

- Accurate data on the costs required to provide a service efficiently and effectively, with a sound system for allocating costs between services.
- Number of customers of different categories for all four services.
- Volumes sold to customers of different categories for water and electricity.
- Distribution of volumes of water and electricity sold between proposed tariff bands for each customer category, if an Inclining Block Tariff is to be considered.
- Peak electricity demand by each customer category, if available.
- Magnitude of external transfers and subsidies available.
- Magnitude of other revenues available.

Historic trends in number of customers, volumes sold and peak demand should be used if available to inform assumptions about future growth in these parameters.

¹ The tool does not calculate property rates. Instead the revenue generated from rates is allocated in the tool and accounted for when calculating the revenue required from tariffs.

In addition, strategic decisions are required on the following:

- How external subsidies (primarily equitable share) are to be allocated between services and customer categories within each service.
- How other revenue sources are to be allocated between services and customer categories within each service.
- Which services, if any, will be allowed to generate deficits, the size of deficit allowed and on which customer categories within the service the deficit will be allowed.
- Which services will generate surpluses, the size of surplus to be generated, and on which customer categories within the service the surplus will be generated.

The user will also have to make choices about the structure of tariffs to be applied: whether to include a fixed charge, how many blocks to set in an inclining block tariff, and what size the blocks should be.

Simple tariff setting can be conducted with less data. However, the more detailed the data the more accurately tariffs can be set to reflect the cost of service incurred for various customer categories. The tool has been developed so that municipalities can work through progressive levels of tariff setting based on the data available.

1.3 Structure of the tool

The tool contains a number of sheets that are used to calculate tariffs. The sheets are ordered based on the three levels of the tool. A brief explanation of each sheet contained in each of the three levels is presented in the table below:

Table 1: List of sheets contained in tool

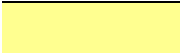
<i>Sheet</i>	<i>Description</i>
Main menu	This sheet contains links to the first few sheets in the tool. A user is required to enter the name of the municipality, the year for which base data is entered and the year for which tariffs are being set.
User instructions	This sheet includes a high-level description of the tool and an explanatory guide to the different sheets of the tool.
<i>Level 1 sheets: focus on the service as a whole</i>	
Revenue	On this sheet, users must enter data on non-tariff revenues anticipated in the year for which tariffs are set and allocate these between the services.
Expenditure	On this sheet, users must enter data on expenditures anticipated in the year for which tariffs are set and allocate these between services.
Surplus	On this sheet, users must decide if deficits are to be accepted on any services. The user must then enter the surpluses to be generated on the trading services and check that these result in sufficient surplus to cross-subsidise any deficits allowed and still generate an adequate surplus on the budget as a whole.
Revenue required	This sheet shows the revenue required from tariffs and the total funding of the budget.

<i>Sheet</i>	<i>Description</i>
1 Customer data	On this sheet, users must enter data on the total number of customers, demand and sales of services (where relevant) for each service.
1 Water	This sheet calculates the fixed cost per customer; the variable cost per unit sold; and the tariff revenue required per unit sold for the water service as a whole.
1 Sanitation	This sheet calculates the fixed cost per customer; the variable cost per unit of wastewater treated; and the tariff revenue required per unit of wastewater treated for the sanitation service as a whole.
1 Electricity	This sheet calculates the fixed customer cost per customer; the fixed demand cost per unit of demand, and the variable cost per unit sold; as well as the tariff revenue required per unit sold for the electricity service as a whole.
1 Solid waste	This sheet calculates the fixed cost per customer for the solid waste service as a whole.
<i>Level 2 sheets: introducing customer categories</i>	
2 Customer data	On this sheet, users must enter data on customer numbers, demand and sales to each customer category within each service.
2 Water	This sheet calculates the average cost per unit and the average revenue required per unit for each water service customer category.
2 Sanitation	This sheet calculates the average cost per unit and the average revenue required per unit for each sanitation service customer category.
2 Electricity	This sheet calculates the average cost per unit and the average revenue required per unit for each electricity service customer category.
2 Solid waste	This sheet calculates the average cost per unit and the average revenue required per unit for each solid waste service customer category.
<i>Level 3 sheets: applying tariff structures and calculating tariffs</i>	
3 Water	This sheet calculates the water tariff for each customer category.
3 Sanitation	This sheet calculates the sanitation tariff for each customer category.
3 Electricity	This sheet calculates the electricity tariff for each customer category.
3 Solid waste	This sheet calculates the solid waste fixed charge per customer category per month.
<i>Reports and affordability</i>	
Set of Report sheets	The “Report” sheets have been formatted for ease of printing and present the Level 2 and Level 3 outputs for each trading service based on user inputs and decisions.
Affordability	This sheet is used to calculate the affordability of the tariffs based on user inputs and decisions.
Engine sheets	These sheets are used to run the tariff affordability calculations. Users are not expected to engage with these sheets.

1.4 Colour coding in the tool

Cells in the tool are colour coded. The table below provides a guide to the colour coding of cells used in the tool.

Table 2: Colour coding in the tool

Colour code	Meaning
	Yellow cells require data entries by the user
	Green cells indicate that a default is available. This means that the tool has proposed an entry for this cell. The user can choose to leave the green cell blank and accept the entry proposed by the tool, or the user can make an entry in the green cell and over-write the default proposed by the tool.
	Grey cells require entries by the user. These are not data entries but decisions that the user must make
	White cells are calculated by the tool

The user must make entries in yellow and grey cells. The user can choose to make entries in green cells or can choose to leave them blank. The user cannot make entries in white cells.

2 Running the tool

This section explains the steps to be followed in each of the three levels.

2.1 Level 1

2.1.1 Revenue sheet

As a first step, users should enter data on non-tariff revenues anticipated in the budget and allocate these between services in the “Revenue” sheet. Non-tariff revenue sources are grouped here into operating grants and transfers, property rates, other income and non-tariff service charges.

Operating grants and subsidies

External operating grants and transfers from national and provincial government are used to subsidise the provision of certain services.

Users must enter the name of each individual operating grant in the column called ‘Operational grants and subsidies’. The Equitable Share is there as an entry that all municipalities must consider. The user must enter the names of any other grants and subsidies that they receive in the yellow cells below this.

The user must then enter the total amount that is anticipated to be received in the year for which the tariffs are being set for each of the operating grants and subsidies in the yellow cells in the column called ‘Total’.

The user must then enter the amount of each grant or subsidy that is to be allocated to each service.

There is a check to the right of the table that the amounts allocated to the services all add up to the total. Users must make sure that this check is zero.

Operational grants and subsidies	Total (R)	Water (R)	Sanitation (R)	Electricity (R)	Solid waste (R)	Other services (R)	Governance and administration (R)	check = 0
Equitable Share	104,923,000		766,495	2,647,055			101,509,450	-
Community Libraries	3,000,000					3,000,000		-
EPWP	1,824,000				500,000	1,324,000		-
FMG	2,259,000						2,259,000	-
Health	1,550,000						1,550,000	-
MSIG - FAR	1,365,000						1,365,000	-
Asset Management Syst	500,000						500,000	-
								-
								-
								-
Total grant allocation per service	115,421,000	-	766,495	2,647,055	500,000	4,324,000	107,183,450	-

Property rates

Property rates are typically used to pay for services that are publicly accessed. This means that property rates are typically allocated to 'other' services. However, property rates might be allocated to a trading service if a portion of that trading service is publicly accessed. This may be the case for the street lighting component of electricity, for example.

Users must enter the anticipated property rates revenue in the year for which tariffs are being set, and then allocate this revenue between the services in the yellow cells.

As a default, users may want to allocate all property rates revenue to 'other' services.

There is a check to the right of the table that the amounts allocated to the services all add up to the total, users must make sure that this check is zero.

	Total (R)	Water (R)	Sanitation (R)	Electricity (R)	Solid waste (R)	Other services (R)	check = 0
Rates funding allocated to publicly accessed functions	104,446,035					104,446,035	-
Total Rates Funding allocated to each service	104,446,035	-	-	-	-	104,446,035	-

Other income sources

Other income sources include other service charges, rental of facilities and equipment, interest earned on external investments, interest earned on outstanding debtors, dividends received, fines, licences and permits, income from agency services *et cetera*.

Users must enter the amount of other income sources anticipated to be received in the year for which the tariffs are being set, and then allocate these between the service in the yellow highlighted cells.

There is a check to the right of the table that the amounts allocated to the services all add up to the total, users must make sure that this check is zero.

	Total (R)	Water (R)	Sanitation (R)	Electricity (R)	Solid waste (R)	Other services (R)	Governance and administration (R)	check = 0
Service charges - other								-
Rental of facilities and equipment	4,775,148					1,392,296	3,382,852	-
Interest earned - external investments	11,965,938	1,669,709	1,029,363	4,650,887	475,740		4,140,239	-
Interest earned - outstanding debtors								-
Dividends received								-
Fines	45,902,000					45,902,000		-
Licences and permits								-
Agency services								-
Other revenue	2,850,097					2,130,097	720,000	-
Gains on disposal of PPE								-
								-
Total	65,493,183	1,669,709	1,029,363	4,650,887	475,740	49,424,393	8,243,091	-

Service charges not set using this tool

There are number of other service charges identified in mSCOA v6.3. that are not set using the tool. These charges include, among others, connection and disconnection charges, meter reading charges, availability charges, and waste disposal charges.

The user must enter the revenues anticipated to be generated from these charges in the year for which the tariffs are being set in the yellow highlighted cells.

Non-tariff revenue	Total (R)	Water (R)	Sanitation (R)	Electricity (R)	Solid waste (R)
Water	-	-			
Connection/disconnection					
Meter reading fees					
Industrial water (non-potable)					
Availability charges					
Wastewater management	-		-		
Industrial effluent					
Treatment of effluent					
Availability charges					
Connection/reconnection					
Pump/removal of wastewater (from tanks)					

Summary: Non-tariff revenue sources received

The tool then provides a summary of the non-tariff revenue sources for each trading service.

2.1.2 Expenditure sheet

Once the user has entered non-tariff revenues and allocated these between services, the user needs to enter the expenditures anticipated in the year for which tariffs are being set and allocate these between services in the “Expenditure” sheet.

Allocating direct costs per function

As a first step to determining the basic cost of supply for each service as a whole, a municipality will need to allocate direct costs between services in order to calculate the total direct cost of providing each service.

The expenditure types in the white cells are from the MBRR classification. Users may choose to enter other expenditure types in the yellow cells in the 'Type of expenditure' column. Alternatively, the user may leave these blank and work only with the MBRR expenditure types.

Users must enter the total anticipated expenditure of each type in the year for which the tariffs are being set in the yellow cells in the column called 'Total'.

This expenditure must then be allocated to each service including 'Other services' and 'Governance and administration' in order to calculate the total direct cost of providing that service. There is a check to the right of the table that the amounts allocated to the services all add up to the total, users must make sure that this check is zero.

Type of expenditure	Total (R)	Water (R)	Sanitation (R)	Electricity (R)	Solid waste (R)	Other services (R)	Governance and administration (R)
Employee related costs	160,142,930	10,355,275	5,548,833	12,407,481	8,290,684	68,002,005	55,538,652
Remuneration of councillors	10,169,644						10,169,644
Debt impairment	100,372,557	12,595,174	3,251,424	29,035,645	3,941,790	39,015,000	12,533,524
Depreciation & asset impairment	41,742,207	3,104,148	1,032,343	5,936,990	846,190	23,962,716	6,859,820
Finance charges	10,030,633			3,712,279		410,109	5,908,245
Bulk purchases	283,672,262	59,532,650	10,498,735	213,640,877			
Other materials	24,797,357	2,460,000	2,045,000	11,340,000	300,000	6,574,987	2,077,370
Contracted services	790,000					300,000	490,000
Transfers and subsidies	-						
Other expenditure	99,268,913	2,504,819	2,607,518	5,347,648	10,454,253	12,019,530	66,335,145
Loss on disposal of PPE							
Total direct costs per service	730,986,503	90,552,066	24,983,853	281,420,920	23,832,917	150,284,347	159,912,400

Allocating governance and administration costs

The cost of supply of a service includes a portion of the governance and administration costs (overheads) of the municipality. Governance and administration costs must therefore be allocated between services in order to determine the full cost of supply of that service.

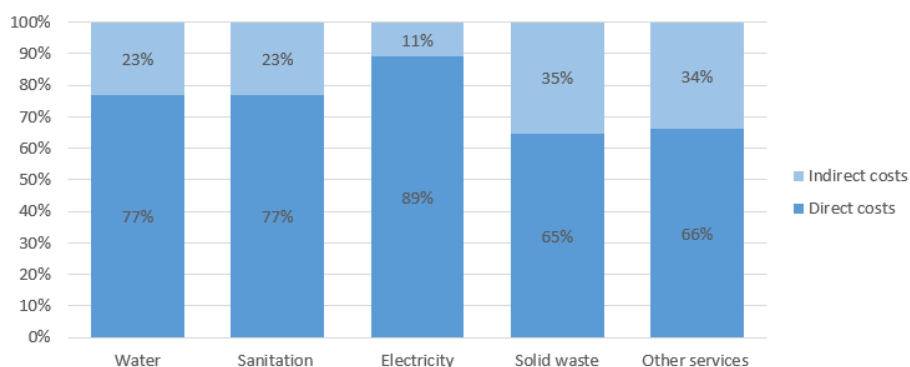
Users must enter the percentage of governance and administration costs that will be allocated to each service in the grey cells.

	Total (R)	Water (R)	Sanitation (R)	Electricity (R)	Solid waste (R)	Other services (R)
% allocation of Gov & Admin costs		17%	5%	22%	8%	48%
	159,912,400	27,352,341	7,441,179	34,819,423	13,096,580	77,202,876

Summary of direct and indirect costs

The total cost of supply for each trading service is the sum of the direct costs of supply and the allocated share of governance and administration costs (indirect costs). The tool calculates the total cost of supply and provides a summary of the direct and indirect costs for each service. The tool also contains a chart showing the proportion of costs that are direct and indirect.

Chart: Proportion of costs that are direct and indirect



2.1.3 Surplus sheet

On the surplus sheet, the user must decide if deficits are to be accepted on any services. The user must then enter the size of any surpluses to be generated on the trading services and

check that these result in sufficient surplus to cross-subsidise any deficits allowed and still generate an adequate surplus on the budget as a whole.

The first box in the “Surplus” sheet summarises the allocation of expenditure and revenues in the previous sheets. Any non-tariff revenue allocated to the Governance and Administration function has been distributed between the services according to the allocation of the Governance and Administration expenditure between the services. There may be a gap to be filled through tariffs on 'Other services' if the property rates revenue and other non-tariff revenues are not sufficient to cover the costs of providing these services.

Deficit to be accepted on services

A municipal council may choose to allow for a deficit to be incurred on some services, subject to the recommendations of the Chief Financial Officer. Deficits may be approved to the extent that they are necessary to ensure that tariffs are affordable. Deficits on a service may only be accommodated if they do not result in an overall budget that is unfunded. Deficits must thus be subsidised out of external subsidies or through cross-subsidisation from other services in order to ensure that the overall budget is funded.

The user must enter the deficit as a percentage of expenditure that they are willing to accept on providing a service in the grey cells. The tool calculates the Rand value of the deficit generated based on the percentage entered.

	Total (R)	Water (R)	Sanitation (R)	Electricity (R)	Solid waste (R)	Other services (R)
Expenditure	730,986,503	117,904,407	32,425,033	316,240,343	36,929,497	227,487,223
Enter deficit to be accepted as % of expenditure		0%	0%	0%	5%	
Deficit generated	15,413,379	-	-	-	1,846,475	13,566,904

Surplus to be generated on services

The Municipal Fiscal Powers and Functions Act Number 12 of 2007 allows municipalities to levy a surcharge on tariffs in appropriate circumstances.

Users must enter the surplus as a percentage of expenditure that they plan to levy in the year for which tariffs are being set for each service in the grey cells. Users should make sure that they have not indicated a surplus to be generated if they have already indicated that there will be a deficit in the box above. If this is done, the cell entry will be highlighted in bold red text.

	Total (R)	Water (R)	Sanitation (R)	Electricity (R)	Solid waste (R)	Other services (R)
Expenditure	730,986,503	117,904,407	32,425,033	316,240,343	36,929,497	227,487,223
Enter surplus to be generated as % of expenditure		8%	5%	3%		
Surplus generated	20,853,273	9,706,743	1,659,320	9,487,210	-	-

In order for the budget to be fully funded, surpluses generated must be sufficient to at least cover anticipated deficits. Ideally, surpluses should exceed anticipated deficits so that the budget generates a net surplus. This is important for long term sustainability as net surpluses provide a source of finance for future capital expenditure.

The tool calculates the net surplus as the total surpluses less the total deficits. This figure must be positive. If it is negative, a user must reduce the deficits to be accepted on services or increase the surpluses to be generated until a positive figure is obtained. The tool will provide an error message if the net surplus is negative.

There is currently no guidance with regard to how large the net surplus should be. MFMA Circular 71 indicates only that it should be positive.

Net surplus or deficit	5,439,895	Net surplus is positive. No further adjustment is required.
Net surplus or deficit as % of expenditure	0.7%	

Allocation of surplus

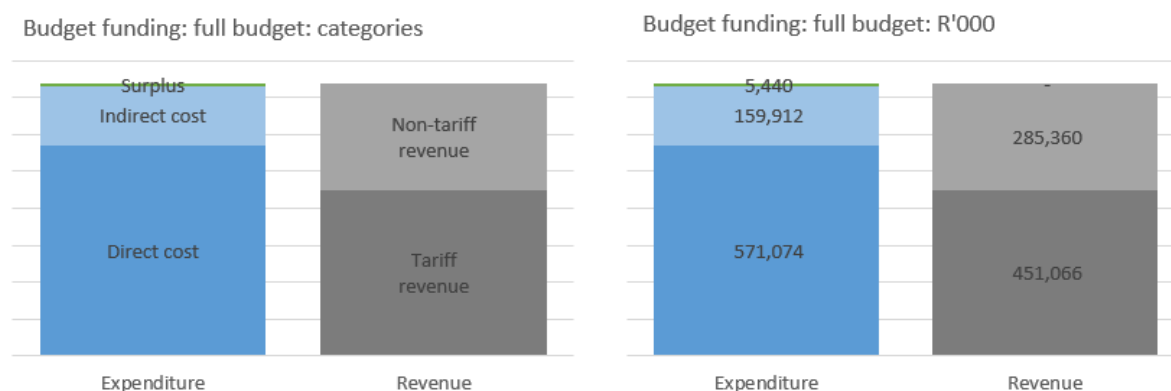
If a municipality is generating surpluses on some services and deficits on others, then the user will need to make some decisions about how the surpluses should be allocated to cross-subsidise the deficits. This must be done in the box below.

The model provides a default allocation that allocates the available surplus to service in proportion to the deficit generated on a service. The user can choose to define an alternative allocation by selecting “No” in the green cell. If the user chooses not to use the default allocation, then entries must be made in the grey cells. This is not necessary for tariff setting, but only to confirm the overall funding of the budget.

Default allocation of surplus to cover deficits	15,413,379	-	-	-	1,846,475	13,566,904
Default % allocation of surplus		0%	0%	0%	12%	88%
Use default allocation?	No					
User defined allocation of surplus to cover deficits	-					
User defined % allocation of surplus						

2.1.4 Revenue required sheet

This sheet is a report sheet that shows the revenue required from tariffs and the total funding of the budget. The revenue required from tariffs for a specific service is the cost of supplying that service less any deficit to be allowed, plus any surplus to be generated, and less non-tariff revenue allocated to the service.



2.1.5 1 Customer data sheet

A sound understanding of customers is a key element of tariff setting. Tariffs might be levied based on number of customers, their demand for services and/or the volumes that they purchase. On this sheet, the user must enter data on total number of customers, volumes of service sold, and demand (if possible) in the base year and the year for which tariffs are set.

Enter water customer data

Users must enter data on the total number of water customers and total annual sales volume in the base year in the yellow cells.

Estimates on the in the number of customers and annual sales volume in the year for which tariffs are to be set should be entered in the grey cells.

The tool calculates the percentage change between the base year and the year for which tariffs are set.

ENTER WATER CUSTOMER DATA			
<i>Enter data on the number of customers and total annual sales volume in the base year in the yellow cells below. Estimate the number of customers and annual sales volume in the year for which tariffs are to be set in the grey cells.</i>			
	2018/19	2019/20	% change
Total number of customers	19,303	19,496	1.0%
Total annual sales (kl per annum)	5,624,712	5,680,959	1.0%

Enter sanitation customer data

Users must enter data on the total number of sanitation customers and total annual water sales volume in the base year in the yellow cells. Note that the water sales volume entered here is the volume of water sold to sanitation customers. This may differ from the volume sold to water customers, entered in the table above, because the set of water customers may be different from the set of sanitation customers.

Estimates on the number of customers and annual water sales volume in the year for which tariffs are to be set should be entered in the grey cells.

The tool calculates the percentage change between the base year and the year for which tariffs are set.

Users must also enter the average % return flow, which is the kl of wastewater treated as a % of the kl of water sold². The tool calculates the volume of wastewater treated by applying this return flow to the volume of water sold to sanitation customers.

ENTER SANITATION CUSTOMER DATA

Enter data on the number of customers and total annual water sales volume in the base year in the yellow cells below. Estimate the number of customers and annual water sales volume in the year for which tariffs are to be set in the grey cells. Note that the water sales volume entered here is the volume sold to sanitation customers. This may differ from the volume sold to water customers, entered in the table above. Also enter the average % return flow, which is the kl of wastewater treated as a % of the kl of water sold.

	2018/19	2019/20	% change
Total number of customers	311,398	314,512	1.0%
Total annual water sales (kl per annum)	4,055,467	4,096,022	1.0%
Average % return flow (kl of wastewater treated as % of kl of water sold)	70%	70%	
Volume of wastewater treated (kl per annum)	2,838,827	2,867,215	1.0%

Enter electricity customer data

For electricity, users must enter the total number of customers, and the total volume of energy sales in kWhs in the base year in the yellow cells.

Estimates on the number of customers and annual sales volume in the year for which tariffs are to be set should be entered in the grey cells.

The tool calculates the percentage change between the base year and the year for which tariffs are set.

If the user has data on the total network demand in kVA in the base year, this should be entered in the yellow cell provided. The user should also enter the estimated kVA in the year for which tariffs are set in the grey cell. If users do not have this data available, these cells can be left blank. The tool calculates the percentage change between the base year and the year for which tariffs are set.

² For sanitation, it is not possible to measure the volume of wastewater returned by an individual customer. Municipalities can estimate this by starting with the volume of water sold to the customer and applying a return flow. A return flow is an assumption about what percentage of the volume of water sold to the customer is returned to the sewerage system. The return flow is calculated as the total volume of wastewater treated divided by the total volume of water sold. The municipality could apply this return flow to the volume of water sold to estimate the volume of wastewater returned. An average return flow for a municipality as a whole is often around 70%.

ENTER ELECTRICITY CUSTOMER DATA

Enter data on the number of customers and total annual sales volume in the base year in the yellow cells below. Estimate the number of customers and annual sales volume in the year for which tariffs are to be set in the grey cells.

If you have data on the total network demand in kVA in the base year, enter this in the yellow cell provided. Also enter the estimated kVA in the year for which tariffs are set in the grey cell. If you do not have this data, these cells can be left blank.

	2018/19	2019/20	% change
Total number of customers	24,147	24,388	1.0%
Total annual sales (kWh per annum)	207,774,850	209,852,598	1.0%
Network demand (kVA)			0.0%

Enter solid waste customer data

For solid waste, users must enter the total number of customers in the base year in the yellow cells.

Estimates on the number of customers in the year for which tariffs are to be set should be entered in the grey cell.

The tool calculates the percentage change between the base year and the year for which tariffs are set.

ENTER SOLID WASTE CUSTOMER DATA

Enter data on the number of customers in the base year in the yellow cell below. Estimate the number of customers in the year for which tariffs are to be set in the grey cell.

	2018/19	2019/20	% change
Total number of customers	20,399	20,603	1.0%

2.1.6 1 Water

Once the customer data has been entered, the “1 Water” sheet calculates the fixed cost per customer, variable cost per unit sold, and the tariff revenue required per unit sold for the water service as a whole.

Allocate fixed and variable costs

In this box, users must specify what proportion of each expenditure type is fixed in the grey cells. The tool calculates what proportion of each expenditure type is variable based on the percentage specified in the “% Fixed” column. Expenditures can be 100% fixed, 100% variable or a mix.

	Total expenditure (R)	% Fixed	% Variable	Fixed costs (R)	Variable costs (R)
Employee related costs	10,355,275	100%	0%	10,355,275	-
Remuneration of councillors	-	100%	0%	-	-
Debt impairment	12,595,174	100%	0%	12,595,174	-
Depreciation & asset impairment	3,104,148	100%	0%	3,104,148	-
Finance charges	-	100%	0%	-	-
Bulk purchases	59,532,650	0%	100%	-	59,532,650
Other materials	2,460,000	100%	0%	2,460,000	-
Contracted services	-	100%	0%	-	-
Transfers and subsidies	-	100%	0%	-	-
Other expenditure	2,504,819	100%	0%	2,504,819	-
Loss on disposal of PPE	-	0%	100%	-	-
0	-	0%	100%	-	-
0	-	0%	100%	-	-
0	-	0%	100%	-	-
Governance and administration	27,352,341	100%	0%	27,352,341	-
Total cost	117,904,407	50%	50%	58,371,757	59,532,650

Calculation of unit costs

The tool calculates fixed and variable unit costs, based on the allocation of costs and the customer data entered in the “1 Customer data” sheet. The tool also calculates the total cost of supply per kl sold.

CALCULATION OF UNIT COSTS

This box shows the fixed and variable unit costs, based on the allocation of costs in the table above. It also shows the total cost of supply per unit sold.

Fixed unit cost (R per customer per month)	249.50
Variable unit cost (R per kl sold)	10.48
Total unit cost (R per kl sold)	20.75

Calculation of unit revenue required for water

This tool calculates the unit revenue required from tariffs for the service. This may be higher or lower than the total unit cost due to the allocation of subsidies, requirement for surpluses and allowance for deficits.

CALCULATION OF UNIT REVENUE REQUIRED FOR WATER

This box shows the unit revenue required from tariffs for the service. This may be higher or lower than the total unit cost due to the allocation of subsidies, requirement for surpluses and allowance for deficits.

	(R)
Total expenditure	117,904,407
Deficit generated on water	-
Surplus generated on water	9,706,743
Expenditure minus deficit plus surplus	127,611,151
Operating grants and transfers	18,333,277
Property rates revenue	-
Other income	3,079,655
Other service charges	-
Total non-tariff revenue	21,412,932
Revenue required from tariff	106,198,219
Average unit revenue required (R per kl sold)	18.69

Summary: Water

This box provides a summary of the fixed and variable unit costs, the total unit cost, and the average unit revenue required for water.

2.1.7 1 Sanitation

The steps listed in the above “1 Water” section should be applied for the calculation of the fixed cost per customer, variable cost per kl treated, and the tariff revenue required per kl treated for the sanitation service as a whole in the “1 Sanitation” sheet.

Similar to water, the user must specify what proportion of each expenditure type is fixed in the grey cells. The tool calculates what proportion of each expenditure type is variable based on the percentage specified in the “% Fixed” column. The tool then calculates fixed and variable unit costs, based on the allocation of costs and the customer data entered in the “1 Customer data” sheet.

2.1.8 1 Electricity

The NERSA Cost of Supply Framework recommends that municipalities break their fixed costs down into two categories, namely ‘customer costs’ and ‘demand costs’. The 1 Electricity sheet is thus slightly more complicated than the 1 Water or 1 Sanitation sheet in that costs must be classified as variable energy costs, fixed customer costs or fixed demand costs.

This sheet calculates the fixed customer cost per customer; the fixed demand cost per unit of demand, and the variable cost per unit sold; as well as the tariff revenue required per unit sold for the electricity service as a whole.

Electricity expenditure by activity

In this box, the user must specify what proportion of each expenditure type is related to customers and what proportion is related to energy sales in the grey highlighted cells. The tool calculates what proportion of each expenditure type is related to demand as the remainder (i.e. 100% minus the % fixed customer costs and minus the % variable energy costs).

Expenditures can be 100% of one category or a mix of categories.

Note that if a user does not have data on network kVA, costs should be allocated as only either fixed customer costs or variable energy costs.

Electricity direct cost components	Total expenditure (R)	% Fixed customer costs	% Variable energy costs	% Fixed demand cost	Customer costs (R)	Energy costs (R)	Demand costs (R)
Employee related costs	12,407,481	100%	0%	0%	12,407,481	-	-
Remuneration of councillors	-	100%	0%	0%	-	-	-
Debt impairment	29,035,645	100%	0%	0%	29,035,645	-	-
Depreciation & asset impairment	5,936,990	100%	0%	0%	5,936,990	-	-
Finance charges	3,712,279	100%	0%	0%	3,712,279	-	-
Bulk purchases	213,640,877	0%	100%	0%	-	213,640,877	-
Other materials	11,340,000	100%	0%	0%	11,340,000	-	-
Contracted services	-	100%	0%	0%	-	-	-
Transfers and subsidies	-	100%	0%	0%	-	-	-
Other expenditure	5,347,648	100%	0%	0%	5,347,648	-	-
Loss on disposal of PPE	-	100%	0%	0%	-	-	-
	-	0%	0%	100%	-	-	-
	-	0%	0%	100%	-	-	-
	-	0%	0%	100%	-	-	-
Overheads	34,819,423	0%	100%	0%	-	34,819,423	-
Total costs	316,240,343	21%	79%	0%	67,780,043	248,460,300	-

Calculation of unit costs

The tool calculates the customer, energy and demand unit costs, based on the allocation of costs in the box shown below.

CALCULATION OF UNIT COSTS	
<i>This box shows the customer, energy and demand unit costs, based on the allocation of costs in the table above. It also shows the total cost of supply per unit sold.</i>	
Customer cost (R per customer per month)	231.60
Energy costs (R per kWh sold)	1.18
Demand cost (R per kVA)	
Total cost (R per kWh sold)	1.51

Similar to water and sanitation, the tool calculates the unit revenue required from tariffs for electricity, which may be higher or lower than the total unit cost due to the allocation of subsidies, requirement for surpluses and allowance for deficits.

2.1.9 1 Solid waste

The tool does not allow for variable costs for solid waste. This is because municipalities in South Africa do not currently have the technology available to measure the mass or volume of waste collected from each customer. No data entries are thus required on the 1 Solid waste sheet. The tool assumes that all costs are fixed.

For solid waste, the tool calculates fixed unit costs based on the number of customers. The tool also calculates the unit revenue required from tariffs from the solid waste service as a whole.

2.2 Level 2

As previously mentioned, Level 2 of the tool introduces customer categories. In this level, users must allocate costs between customer categories, and decide which categories will be subsidised and which will generate surpluses.

2.2.1 2 Customer data

Most municipalities do not offer a single tariff to all customers. Typically, different tariffs are offered to different customer categories. In this sheet, the user enters data on customers, demand and sales for each customer category within each trading service.

Enter water customer data

The user must provide a name for each customer category and indicate its classification from the grey drop down list in the next column. A customer category is a group of customers who will all pay the same tariff.

The user must then enter the number of customers in each category and the volumes sold to that category for the base year.

By default, the tool uses the unit growth factors calculated on the '1 Customer data' sheet to estimate the number of customers and volumes sold in the year for which tariffs are set. If the user wishes to over-write these defaults, they can enter their own estimates of number of customers and volumes sold to each category in the year for which tariffs are set in the green cells. The user may choose to leave these green cells blank and use the default figures calculated by the tool.

Municipal customer name	Select standard customer classification	Number of customers 2018/19	Volume sold (kl pa) 2018/19	Default number of customers 2019/20	Customised number of customers 2019/20	Default volume sold (kl pa) 2019/20	Customised volume sold (kl pa) 2019/20	Average monthly sales (kl/customer/month)
Indigents	Indigent	2,562	414,641	2,588		418,787		13.5
Domestic	Domestic	16,043	3,600,792	16,203		3,636,800		18.7
Domestic Flats	Domestic	82	88,311	83		89,194		89.7
Schools/Hostels/Church/Sport	Institutional	48	30,136	48		30,437		52.3
Departmental and government	Institutional	141	336,228	142		339,590		198.7
Business	Commercial	372	527,934	376		533,213		118.3
Industrial	Industrial	55	626,670	56		632,937		949.5
				-		-		-
				-		-		-
				-		-		-
				-		-		-
				-		-		-
				-		-		-
				-		-		-
				-		-		-
				-		-		-
				-		-		-
				-		-		-
				-		-		-
				-		-		-
Total		19,303	5,624,712	19,496	-	5,680,959	-	
check = 0		-	-	-		-		

Enter sanitation customer data

The user must provide a name for each customer category and indicate its classification from the grey drop down list in the next column. A customer category is a group of customers who will all pay the same tariff.

The user must then enter the number of customers in each category and the volumes of water sold to that category for the base year.

By default, the tool uses the unit growth factors calculated on the '1 Customer data' sheet to estimate the number of customers and volumes of water sold in the year for which tariffs are set. If the user wishes to over-write these defaults, they can enter their own estimates of number of customers and volumes sold to each category in the year for which tariffs are set in the green cells. The user may choose to leave these green cells blank and use the default figures calculated by the tool.

The user must also enter the assumed return flow for each customer category.

Customer categories	Select customer category	Number of customers 2018/19	Volume of water sold (kl pa) 2018/19	Default number of customers 2019/20	Customised number of customers 2019/20	Default volume of water sold (kl pa) 2019/20	Customised volume of water sold (kl pa) 2019/20	Average % return flow	Volume of wastewater treated (kl pa) 2019/20
Domestic	Domestic	260,551	3,600,792	263,157	-	3,636,800	-	70%	2,545,760
Domestic Flats	Domestic	5,403	88,311	5,457	-	89,194	-	70%	62,436
Business/Industrial/Other/Churches/Schools	Industrial	40,224	30,136	40,626	-	30,437	-	70%	21,306
Departmental	Institutional	5,220	336,228	5,272	-	339,590	-	70%	237,713
				-	-	-	-	-	-
				-	-	-	-	-	-
				-	-	-	-	-	-
				-	-	-	-	-	-
				-	-	-	-	-	-
				-	-	-	-	-	-
				-	-	-	-	-	-
				-	-	-	-	-	-
				-	-	-	-	-	-
				-	-	-	-	-	-
				-	-	-	-	-	-
				-	-	-	-	-	-
				-	-	-	-	-	-
				-	-	-	-	-	-
Total		311,398	4,055,467	314,512	-	4,096,022	-	-	2,867,215
check = 0		-	-	-	-	-	-	-	-

Enter electricity customer data

The user must provide a name for each customer category and indicate its classification from the grey drop down list in the next column. A customer category is a group of customers who will all pay the same tariff.

The user must then enter the number of customers in each category, the volumes of electricity sold to that category and the maximum kVA demand for the category (if the latter is available) for the base year.

By default, the tool uses the unit growth factors calculated on the '1 Customer data' sheet to estimate the number of customers, volumes of electricity sold and maximum kVA demand in the year for which tariffs are set. If the user wishes to over-write these defaults, they can enter their own estimates of number of customers, volumes sold and kVA demand by each category in the year for which tariffs are set in the green cells. The user may choose to leave these green cells blank and use the default figures calculated by the tool.

Customer categories	Select customer category	Number of customers 2018/19	Volume sold (kl pa) 2018/19	Maximum demand (kVA) 2018/19	Default number of customers 2019/20	Customised number of customers 2019/20	Default volume sold (kWh pa) 2019/20	Customised volume sold (kWh pa) 2019/20	Default maximum demand (kVA) 2019/20	Customised maximum demand (kVA) 2019/20
Indigents	Indigent	282	1,239,528	-	285	-	1,251,923	-	-	-
Domestic	Domestic	22,904	78,317,452	-	23,133	-	79,100,627	-	-	-
Departmental	Institutional	268	4,994,389	-	271	-	5,044,333	-	-	-
Res resell/Business	Commercial	1	1,118,344	-	1	-	1,129,527	-	-	-
Low commercial	Commercial	596	19,209,373	-	602	-	19,401,467	-	-	-
Medium commercial 230/400V	Commercial	37	8,378,374	-	37	-	8,462,157	-	-	-
Medium commercial 230/400V & <11KV	Commercial	38	10,077,371	-	38	-	10,178,144	-	-	-
Industrial	Industrial	21	84,440,020	-	21	-	85,284,420	-	-	-
					-	-	-	-	-	-
					-	-	-	-	-	-
					-	-	-	-	-	-
					-	-	-	-	-	-
					-	-	-	-	-	-
					-	-	-	-	-	-
					-	-	-	-	-	-
					-	-	-	-	-	-
					-	-	-	-	-	-
					-	-	-	-	-	-
					-	-	-	-	-	-
Total		24,147	207,774,850	-	24,388	-	209,852,598	-	-	-

Enter solid waste customer data

For solid waste, the user must provide a name for each customer category and indicate its classification from the grey drop down list in the next column. A customer category is a group of customers who will all pay the same tariff.

The user must then enter the number of customers in each category for the base year. By default, the tool uses the unit growth factors calculated on the '1 Customer data' sheet to estimate the number of customers in the year for which tariffs are set. If the user wishes to over-write these defaults, they can enter their own estimates of number of customers in each category in the year for which tariffs are set in the green cells. The user may choose to leave these green cells blank and use the default figures calculated by the tool.

2.2.2 2 Water

This sheet calculates the average cost per unit and the average revenue required per unit for each water service customer category.

Calculation of average unit costs per customer category

The tool allocates variable costs between customer categories based on volumes of water sold to each category. By default, the tool allocates fixed costs between customers also based on volumes of water sold to the category. The user can choose to allocate fixed costs based on number of customers by selecting '% of customers' from the green drop down list.

Allocation of fixed costs	% volume sold
Allocation of variable costs	% volume sold

[illegible]

Determining the revenue requirement per customer category

The revenue requirement per customer category is calculated by allocating non-tariff revenue sources, deficits and surpluses between customer categories to determine the revenue required per customer category.

Calculation of revenue requirement per customer category: Adjusted for non-tariff revenue

Municipalities need to allocate non-tariff revenue sources between customer categories defined for that service. Recall that non-tariff revenue sources include operating grants and subsidies, property rates, other income sources, and non-tariff service charges.

In the "Revenue" and "Revenue required" sheets, non-tariff revenue sources were allocated between services. The user must how allocate any non-tariff revenue that was allocated to the water service between customer categories defined for that service. Defaults are provided by the model. These defaults allocate the non-tariff revenue sources (property rates revenue, other income and other service charges) in proportion to the total expenditure on each customer category. Users can over-write defaults by making entries in the blank green cells adjacent to those containing the default allocations. Alternatively, the user may choose to leave these green cells blank and use the default figures calculated by the tool.

If users choose to over-write the default allocations by making entries in the green cells, they should allocate all of the relevant revenues between the customer categories. There are checks provided in red at the bottom of the column. If users make any entries in the green cells, they should make sure that all checks are zero.

Municipal customer name	Standard customer classification	Total expenditure (R)	Default allocation of property rates revenue (R)	Customised allocation of property rates revenue (R)	Default allocation of other income (R)	Customised allocation of other income (R)	Default allocation of other service charges (R)	Customised allocation of other service charges (R)	Total expenditure adjusted for non-tariff revenue (R)
		117,904,407	-		3,079,655		-		114,824,752
Indigents	Indigent	8,691,645	-		227,025		-		8,464,620
Domestic	Domestic	75,479,286	-		1,971,514		-		73,507,772
Domestic Flats	Domestic	1,851,163	-		48,352		-		1,802,810
Schools/Hostels/Church/Sport	Institutional	631,707	-		16,500		-		615,206
Departmental and government	Institutional	7,047,963	-		184,092		-		6,863,871
Business	Commercial	11,066,477	-		289,056		-		10,777,421
Industrial	Industrial	13,136,167	-		343,116		-		12,793,051
0	0	-	-		-		-		-
0	0	-	-		-		-		-
0	0	-	-		-		-		-
0	0	-	-		-		-		-
0	0	-	-		-		-		-
0	0	-	-		-		-		-
0	0	-	-		-		-		-
0	0	-	-		-		-		-
0	0	-	-		-		-		-
0	0	-	-		-		-		-
0	0	-	-		-		-		-
0	0	-	-		-		-		-
0	0	-	-		-		-		-
0	0	-	-		-		-		-
check=0			-		-		-		-

Calculation of revenue requirement per customer category: Adjusted for operating grants and subsidies

In this box, the user must now allocate any operating grants and transfers between customer categories. Defaults are provided by the model. These defaults allocate operating grants and subsidies first to any categories identified as indigent. If there are no indigent customer categories, the default is to allocate external operating grants and subsidies to domestic customer categories. The user can choose a different allocation by entering values in the green cells. Alternatively, the user may choose to leave these green cells blank and use the default figures calculated by the tool.

Municipal customer name	Standard customer classification	Total expenditure adjusted for non-tariff revenue (R)	Default allocation of operating grants and subsidies (R)	Customised allocation of operating grants and subsidies (R)	Total expenditure adjusted for operating grants and subsidies (R)
		114,824,752	18,333,277		96,491,476
Indigents	Indigent	8,464,620	8,464,620		-
Domestic	Domestic	73,507,772	9,632,417		63,875,355
Domestic Flats	Domestic	1,802,810	236,239		1,566,571
Schools/Hostels/Church/Sport	Institutional	615,206	-		615,206
Departmental and government	Institutional	6,863,871	-		6,863,871
Business	Commercial	10,777,421	-		10,777,421
Industrial	Industrial	12,793,051	-		12,793,051
0	0	-	-		-
0	0	-	-		-
0	0	-	-		-
0	0	-	-		-
0	0	-	-		-
0	0	-	-		-
0	0	-	-		-
0	0	-	-		-
0	0	-	-		-
0	0	-	-		-
0	0	-	-		-
0	0	-	-		-
0	0	-	-		-
0	0	-	-		-
0	0	-	-		-
check=0		-	-		-

Calculation of revenue requirement per customer category: Allocating surpluses and deficits

In the "Surplus" sheet, the user specified whether they are willing to accept a deficit or whether a surplus must be generated on a service. If a deficit is accepted or a surplus is generated on the service, the user must now use this table to specify on which customer

categories the deficit or surplus will be generated. By default, the model assumes that deficits will be generated first on indigent customers and then on domestic customers. By default, the model distributes the surplus evenly across all categories not identified as Indigent. The user can over-write these defaults by making entries in the green cells. Alternatively, the user may choose to leave these green cells blank and use the default figures calculated by the tool.

Municipal customer name	Standard customer classification	Total expenditure adjusted for operating grants and subsidies (R)	Default allocation of deficit accepted on water service (R)	Customised allocation of deficit accepted on water service (R)	Default allocation of surplus generated on water service (R)	Customised allocation of surplus generated on water service (R)	Total expenditure adjusted for surplus or deficit on service (R)
		96,491,476	-	-	9,706,743	9,706,743	106,198,219
Indigents	Indigent	-	-		-	-	-
Domestic	Domestic	63,875,355	-		6,425,663	-	63,875,355
Domestic Flats	Domestic	1,566,571	-		157,592	-	1,566,571
Schools/Hostels/Church/Sport	Institutional	615,206	-		61,888	192,326	807,533
Departmental and government	Institutional	6,863,871	-		690,484	2,145,791	9,009,661
Business	Commercial	10,777,421	-		1,084,175	3,369,249	14,146,670
Industrial	Industrial	12,793,051	-		1,286,941	3,999,377	16,792,428
0	0	-	-		-	-	-
0	0	-	-		-	-	-
0	0	-	-		-	-	-
0	0	-	-		-	-	-
0	0	-	-		-	-	-
0	0	-	-		-	-	-
0	0	-	-		-	-	-
0	0	-	-		-	-	-
0	0	-	-		-	-	-
0	0	-	-		-	-	-
0	0	-	-		-	-	-
0	0	-	-		-	-	-
0	0	-	-		-	-	-
0	0	-	-		-	-	-
check=0		-	-		-	-	-

Calculation of revenue requirement per customer category: Allowing for cross subsidisation between customers

In this box, users must specify any cross-subsidisation that is to take place between customer categories within the water service. The user must specify whether additional surpluses will be generated on any customer categories by entering percentages in the grey cells. Surpluses are specified as percentage of expenditure. Users must then allocate any surpluses generated between the remaining customer categories. This is done by specifying what percentage of the surplus generated should be allocated to each customer category. The sum of any percentages entered in the "Allocation of surplus (%)" column must be 100%.

The revenue required for a specific service per customer category is the cost of supplying the service to that customer category, less non-tariff revenue allocated to the customer category, less any deficit allowed allocated per customer category, plus any surplus generated per customer category.

[illegible]

2.2.3 2 Sanitation

The entries required on the 2 Sanitation sheet are identical to those on the 2 Water sheet. Refer to Section 2.2.2.

2.2.4 2 Electricity

The entries required on the 2 Electricity sheet are identical to those on the 2 Water sheet. Refer to Section 2.2.2.

2.2.5 2 Solid waste

The entries required on the 2 Solid waste sheet are identical to those on the 2 Water sheet. Refer to Section 2.2.2.

2.3 Level 3

As mentioned previously, Level 3 introduces tariff structures. In these sheets, the tool calculates what level of tariff to levy for each component of the tariff structure and for each customer group. Tariff structures tend to fall on a spectrum from simple (with the simplest being a fixed charge per customer) to complex (multi-part time-of-use tariffs, for example). The tool allows for fixed charges and inclining block tariffs only. For electricity, there is an allowance for a seasonal tariff.

Fixed charges are the simplest tariff structure. Fixed charges are unrelated to the amount of service sold to the customer. Fixed charges may be levied on various bases, for example per customer or per fixture (number of bins collected, for example).

Inclining block tariffs are levied per unit sold. Inclining block tariffs are considered equitable because a customer who uses more of a service will pay more for the service. An inclining block tariff can only be applied where it is possible to measure the volume of a service sold to a customer.

2.3.1 3 Water

This sheet calculates the water tariff for each customer category. The DWS Norms and Standards for Water Services (2015) require municipalities to have an inclining block tariff for water. Municipalities can choose whether to combine this with a fixed charge. The tool thus allows the user to set the size of a fixed charge for each customer category. If the user does not wish to apply a fixed charge, they can set this to zero. The user must then specify an inclining block tariff for each customer category.

Fixed water tariff

The user must first enter the fixed charge to be charged per customer in the grey cell. Zero can be entered if no fixed cost is to be applied. The tool provides the fixed cost per customer as a guide. In this tariff structure, the user can choose to set the fixed charge at a level that is lower than the fixed cost. The tool calculates the revenue from fixed charges based on the fixed charge entered in the grey cell.

Fixed water tariff
 User must enter fixed charge to be charged per customer. Zero can be entered if no fixed cost is to be applied. The tool provides the fixed cost per customer as a guide.

	Fixed costs per customer category	Fixed cost per customer per month	Fixed charge per customer (per	Revenue from fixed charges (Annual)	Revenue from fixed charges (Monthly)
Domestic Flats	916,468	922.15	50.00	49,692	4,141

Inclining block tariff

Once the fixed charge has been entered, the user must now enter data required for the calculation of the inclining block tariff.

The user must first select the number of blocks by clicking on the grey highlighted cell. The tool allows for up to a maximum of 10 tariff blocks for water.

User must then enter the top of each block, the % increase in tariffs between tariff blocks and the volume of water sold in each block in the grey or yellow cells.

The model calculates the tariffs and revenue received from each block. This is done to ensure that the revenue required from the tariff, previously calculated in the tool, is generated.

Inclining block tariff
 User must select the number of blocks by clicking on the green highlighted cell. User must then enter the top of each block, the % increase in tariffs between tariff blocks and the volume of water sold in each block in the yellow highlighted cells. The model calculates the tariffs and revenue received from each block.

Select number of blocks

Block Number	Bottom of Block	Top of block	% increase in tariffs	Volume of water sold in block	Tariff (R/kl)	Revenue received from block
1	0.00	6.00		3,431,800	10.0	34,397,144
2	6.01	10.00	10%	95,000	11.0	1,047,410
3	10.01	30.00	20%	45,000	13.2	595,370
4	30.01	50.00	30%	55,000	17.2	945,977
5	50.01	70.00	40%	10,000	24.1	240,794
					-	-
					-	-
					-	-
					-	-
		More			-	-

2.3.2 3 Sanitation

This sheet calculates the sanitation tariff for each customer category. The DWS Norms and Standards for Water Services (2015) require municipalities to have an inclining block tariff based on volumes of water sold for sanitation. Municipalities can choose whether to combine this with a fixed charge. The tool thus allows the user to set the size of a fixed charge for each customer category. If the user does not wish to apply a fixed charge, they can set this to zero. The user must then specify an inclining block tariff for each customer category.

Fixed sanitation tariff

The user must first set the fixed charge to be charged per customer in the grey cell. Zero can be entered if no fixed cost is to be applied. The tool provides the fixed cost per customer as a guide. In this tariff structure, the user can choose to set the fixed charge at a level that is lower than the fixed cost. The tool calculates the revenue from fixed charges based on the fixed charge entered in the grey cell.

Fixed sanitation tariff
User must enter fixed charge to be charged per customer. Zero can be entered if no fixed cost is to be applied. The tool provides the fixed cost per customer as a guide.

	Fixed costs per customer category	Fixed cost per customer per month	Fixed charge per customer (per month)	Revenue from fixed charges (Annual)	Revenue from fixed charges (Monthly)
Domestic	28,789,730	9.12	5.00	15,789,391	1,315,783

Inclining block tariff

Once the fixed charge has been entered, the user must now enter data required for the calculation of the inclining block tariff. The user must first select the number of blocks for the tariff structure by clicking on the grey cell. The tool allows for up to a maximum of 10 tariff blocks for sanitation.

User must then enter the return flow, top of each block, the % increase in tariffs per estimated kl of wastewater returned between tariff blocks and the volume of water sold in each block in the grey or yellow highlighted cells.

The tool calculates the tariffs and revenue received from each block. This is done to ensure that the revenue required from the tariff, previously calculated in the tool, is generated.

Inclining block tariff
User must select the number of blocks by clicking on the grey highlighted cell. User must then enter the return flow, top of each block, the % increase in tariffs per estimated kl of wastewater returned between tariff blocks and the volume of water sold in each block in the grey highlighted cells. The model calculates the tariffs and revenue received from each block.

Select number of blocks:

Total annual water sales volume (kl):

Block Number	Return flow	Bottom of block	Top of block	% increase in tariffs per estimated kl of wastewater returned	Volume of water sold in block	Estimated volume of wastewater returned in block	Tariff per estimated kl of wastewater returned	Tariff per kl water sold	% increase in tariffs per kl of water sold	Revenue received from block
1	70%	0.00	6.00		3,363,013	2,354,109	2.91	2.03		6,841,300
2	70%	6.01	10.00	10%	95,000	66,500	3.20	2.24	10%	212,582
3	70%	10.01	30.00	20%	45,000	31,500	3.84	2.69	20%	120,836
4	70%	30.01	50.00	30%	55,000	38,500	4.99	3.49	30%	191,995
5	70%	50.01	70.00	40%	10,000	7,000	6.98	4.89	40%	48,871
6	70%	70.01		50%	68,787	48,151	10.47	7.33	50%	504,261
	70%	0.01				-	-	-	-100%	-
	70%	0.01				-	-	-	-	-
	70%	0.01				-	-	-	-	-
	70%	0.01	More			-	-	-	-	-

2.3.3 3 Electricity

This sheet calculates the electricity tariff for each customer category. NERSA requires municipalities to have an inclining block tariff for electricity. Municipalities can choose whether to combine this with a fixed charge. The tool thus allows the user to set the size of a fixed charge for each customer category. If the user does not wish to apply a fixed charge, they can set this to zero. The user must then specify an inclining block tariff for each customer category. The user can choose either an inclining block tariff that applies throughout the year, or a seasonal inclining block tariff that differs in high or low season.

Fixed electricity tariff

The user must first enter the fixed charge to be charged per customer in the grey cell. Zero can be entered if no fixed cost is to be applied. The tool provides the fixed cost per customer as a guide. In this tariff structure, the user can choose to set the fixed charge at a level that is lower than the fixed cost. The tool calculates the revenue from fixed charges based on the fixed charge entered in the grey cell.

Fixed electricity tariff
 User must enter fixed charge to be charged per customer. Zero can be entered if no fixed cost is to be applied. The tool provides the fixed cost per customer as a guide.

	Fixed costs per customer category	Fixed cost per customer per month	Fixed charge per customer per month	Revenue from fixed charges (Annual)	Revenue from fixed charges (Monthly)
Domestic	64,290,972	231.60	50.00	13,879,824	1,156,652

Inclining block tariff

Once the fixed charge has been entered, the user must now enter data required for the calculation of the inclining block tariff. The user must first select the inclining block tariff type by clicking on the grey highlighted cell. User must then enter the data inputs required for the chosen IBT type.

Inclining block tariff

User must first select the inclining block tariff type by clicking on the grey highlighted cell. User must then enter the data inputs required for the chosen IBT type.

Select IBT type Annual

If an annual IBT is chosen, the user must select the number of blocks by clicking on the grey highlighted cell. The tool allows for up to a maximum of 5 tariff blocks for electricity.

The user must then enter the top of each block, the % increase in annual tariffs between tariff blocks in the grey cells and the volume of annual energy sold in each block in the grey or yellow cells.

The tool calculates the tariffs and revenue received from each block. This is done to ensure that the revenue required from the tariff, previously calculated in the tool, is generated.

Annual Inclining Block Tariff
 User must select the number of blocks by clicking on the grey highlighted cell. User must then enter the top of each block, the % increase in annual tariffs between tariff blocks in the grey cells and the volume of annual energy sold in each block in the yellow cells.

Select number of blocks 5

Block Number	Bottom of block	Top of block	% increase in annual tariffs	Volume of annual energy sold in block	Annual tariff	Annual revenue
1	0.00	50		78,520,627	2.21	173,333,123
2	50.01		10%	100,000	2.43	242,823
3	0.01		20%	250,000	2.91	728,470
4	0.01		30%	175,000	3.79	662,908
5	0.01	More	40%	55,000	5.30	291,679

If a seasonal IBT is chosen, the user must select the number of blocks by clicking on the grey cell.

The user must then enter the high and low season energy sales, the high season tariff block 1 as a % of low season tariff block 1, the top of each block, the % increase in seasonal tariffs between tariff blocks and the volume of energy sold in the high and low season for each block except the first in the yellow or grey cells.

The tool calculates the tariffs and revenue received from each block. This is done to ensure that the revenue required from the tariff, previously calculated in the tool, is generated.

Seasonal Inclining Block Tariff
 User must select the number of blocks by clicking on the grey highlighted cell. User must then enter the high and low season energy sales, the high season tariff block 1 as a % of low season tariff block 1, the top of each block, the % increase in seasonal tariffs between tariff blocks and the volume of energy sold in the high and low season for each block except the first in the yellow or grey highlighted cells.

Select number of blocks: 5
 High season energy sales: 938,942
 Low season energy sales: 312,981
 High season tariff block 1 as % of low season tariff block 1: 120%

Block Number	Bottom of block	Top of block	% increase in high season tariffs	% increase in low season tariffs	Volume of energy sold in high season per block	Volume of energy sold in low season per block	High season tariff	Low Season Tariff	High season tariff as % of low season tariff	High season revenue	Low season revenue
1	0.00	50			358,942	37,981	113.62	94.69	120%	40,784,694	3,596,296
2	50.01	100	10%	10%	100,000	50,000	124.99	104.16	120%	12,498,706	5,207,794
3	100.01	150	20%	10%	250,000	175,000	149.98	114.57	131%	37,496,118	20,050,008
4	150.01	200	30%	10%	175,000	35,000	194.98	126.03	155%	34,121,468	4,411,002
5	200.01	More	40%	10%	55,000	15,000	272.97	138.63	197%	15,013,446	2,079,472

2.3.4 3 Solid waste

This sheet calculates the solid waste fixed charge per customer category per month. No user entries are required.

3 Report sheets

The tool includes a set of report sheets for each trading service. The report sheets have been formatted for ease of printing and contain a summary of the Level 2 and Level 3 outputs per customer category for each trading service based on user inputs and decisions.

4 Affordability sheet

This sheet is used to determine the affordability of the tariffs to customers. This is done by calculating the household bill for all four services for some 'typical' customers. The user must specify the typical customers and indicate what tariff applies to them. The tariffs set in the tool are then used to calculate the bill and the bill as a % of monthly income.

Specifying 'typical' households

Users must specify some 'typical' households in the table below. This means indicating what income an indigent, low income, middle income and high income household in the municipality earns, and what volumes of water and electricity they purchase. This may differ from one municipality to another. Ideally, municipalities should make these entries based on some analysis of consumption patterns in the area that they serve. Municipalities often assume that indigent or low income customers in particular purchase less water and electricity than they in fact do in reality.

SPECIFYING 'TYPICAL' HOUSEHOLDS

The user must specify some 'typical' households in the table below. This means indicating what income an indigent, low income, middle income and high income household in your municipality earns, and what volumes of water and electricity they purchase.

Customer Type	Income per household	Water (kl/month purchased)	Electricity (kWh/month purchased)
Indigent	3,500	7	350
Low Income	4,000	7	350
Middle Income	12,000	19	500
High Income	25,000	30	800

Tariff categories applying to 'typical' households

The user must then indicate what tariff applies to each of the customer types, by selecting from the dropdown lists below. These dropdown lists are drawn from the customer categories previously entered by the user on the '2 Customer data' sheet.

TARIFF CATEGORIES APPLYING TO 'TYPICAL' HOUSEHOLDS

The user must then indicate what tariff applies to each of the customer types, by selecting from the dropdown lists below. These dropdown lists are drawn from the customer categories previously entered by the user on the '2 Customer data' sheet.

Customer Type	Water	Sanitation	Electricity	Solid waste
Indigent	Indigents	Domestic	Indigents	Domestic
Low Income	Domestic	Domestic	Domestic	Domestic
Middle Income	Domestic	Domestic	Domestic	Domestic
High Income	Domestic	Domestic Flats	Domestic	Domestic

The user may have applied an annual or seasonal electricity tariff for the tariff category that applies to each 'typical' household. If the tariff is an annual tariff, the user should select 'annual' from the dropdown list available. If the tariff is a seasonal tariff, the user should indicate whether the bill should be calculated for the high or low demand season.

Customer Type	IBT type	Season in which bill is calculated
Indigent	Seasonal	High demand season
Low Income	Annual	Annual
Middle Income	Annual	Annual
High Income	Annual	Annual

The resulting monthly bills are shown in a table below, as are the monthly bills as a percentage of monthly income for domestic customers.

MONTHLY MUNICIPAL BILL

The table below calculates the monthly municipal bill for each customer type.

	Water Bill	Sanitation Bill	Electricity Bill	Solid Waste Bill
Indigent	-	19.24	-	97.08
Low Income	171.05	19.24	1,894.96	97.08
Middle Income	323.07	47.81	2,690.45	97.08
High Income	468.61	554.65	4,281.43	97.08

MUNICIPAL BILL AS % OF HOUSEHOLD INCOME

The table below calculates the municipal bill as a % of household income for each customer type.

	Water Bill	Sanitation Bill	Electricity Bill	Solid Waste Bill
Indigent	0%	1%	0%	3%
Low Income	4%	0%	47%	2%
Middle Income	3%	0%	22%	1%
High Income	2%	2%	17%	0%

The Affordability sheet also includes a chart showing the monthly municipal bill as well as a chart showing the monthly municipal bill as a percentage of income shown below.

Chart: Monthly municipal bill

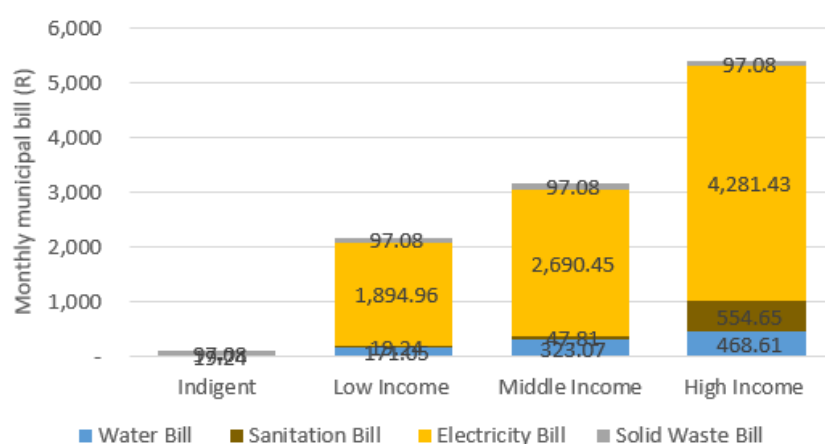
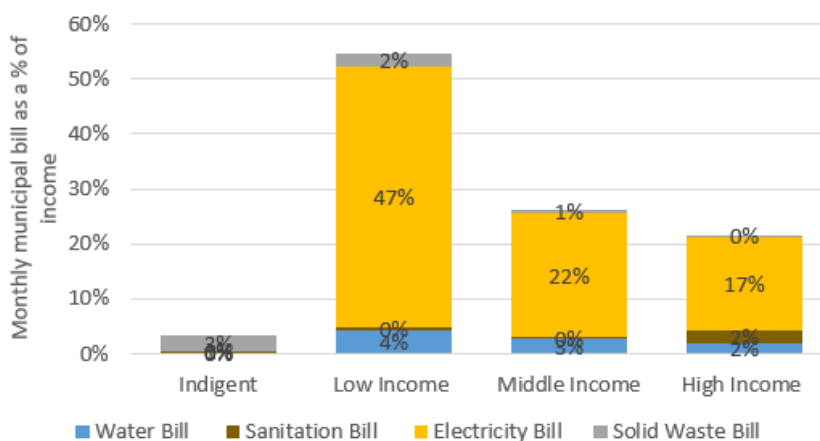


Chart: Monthly municipal bill as a % of income



References

DWS (2015) *Revision of the norms and standards for setting water services tariffs in terms of Section 10 of The Water Services Act, 1997*, Department of Water and Sanitation, Pretoria

NERSA (2019) *Consultation paper on municipal tariff guideline increase, benchmarks and proposed timelines for municipal tariff approval process for the 2019/20 financial year*, National Electricity Regulator of South Africa, Pretoria